

REMARKS

Claims 1-4 and 6-22 have been examined and remain in the Application. Claim 5 is cancelled. New Claims 23-28 are added. Accordingly, Claims 1-4 and 6-28 are pending.

Claims 1-5, 7, 9-12, 15, and 18-19 are rejected under 35 U.S.C. § 102(e). Claims 6, 8, 13-14, 16-17, and 20-22 are rejected under 35 U.S.C. § 103(a).

A. 35 U.S.C. § 102(e): Rejection of Claims 1-5, 7, 9-12, 15, and 18-19

The United States Patent and Trademark Office (USPTO) rejects Claims 1-5, 7, 9-12, 15, and 18-19 under 35 U.S.C. § 102(e) as anticipated by United States Patent No. 6,159,858 issued to Kishii et al. (hereinafter "Kishii"). Applicants respectfully traverse as to these claims.

(1) Rejection of Claim 1

In order to anticipate a claim, the relied upon reference must disclose every limitation of the claim. Claim 1 discloses a method for removing a particle from a surface of a metal plug formed in a via, wherein after a metal layer has been polished with a first agent, a second agent comprising hydrogen peroxide is introduced to rinse the surface of a metal plug and at least one particle is removed from the surface of the metal plug.

Kishii discloses a slurry containing manganese oxide that is used to polish the elements of a conductive layer until an insulation layer is exposed, and then a layer of the substrate is cleaned using a cleaning solution containing acid, hydrogen peroxide and water so as to dissolve abrasive material. (Kishii, col. 14, lines 49-50, and Claim 1).

Accordingly, Kishii recites using hydrogen peroxide in an "acid cleaning process" (Kishii, col. 14, lines 56-57), whereas, Applicants' invention recites rinsing with an agent comprising hydrogen peroxide. In integrated circuit processing, which is the field of

Applicants' invention, "cleaning" and "rinsing" concern separate aspects of processing.

Cleaning has been defined as the:

"process of removing contaminants (particles as well as metallic and organic) from the surface of the wafer", (J. Ruzyllo, Semiconductor Glossary, 2001, <<http://semiconductorglossary.com>>).

Rinsing has been defined as the:

"process in which [a] wafer is immersed in deionized water in order to stop chemical reactions initiated during preceding operation and to remove products of these reactions from the surface." (*Id.*).

For example, wafers are often cleaned with solutions containing acid, and then later rinsed with de-ionized water. One purpose of rinsing is to reduce water spots and other leftover residues from cleaning, which can cause defects such as submicron contaminants on wafers prior to the next process step.

Because Kishii does not disclose rinsing the surface of a metal plug, independent Claim 1 is not anticipated by Kishii. Accordingly, Applicants respectfully request withdrawal of the rejection of independent Claim 1 under 35 U.S.C. § 102(e).

(2) Rejection of Dependent Claims 2-5 and 8

Dependent Claims 2-5, and 8 depend from Claim 1. Therefore, Claims 2-5 and 8 contain all of the limitations of Claim 1, and are not anticipated by Kishii at least for the reasons that Claim 1 is not anticipated by such reference. Accordingly, Applicants respectfully request withdrawal of the rejections of dependent Claims 2-5 and 8 under 35 U.S.C. § 102(e).

(3) Rejection of Independent Claim 9 and Dependent Claims 10-12

Independent Claim 9 also recites limitations relating to rinsing. Therefore, at least for the reason stated with respect to Claim 1, Claim 9 is not anticipated by Kishii. Because Claims 10-12 depend from Claim 9, Claims 10-12 contain all of the limitations of Claim 1, and are not anticipated by Kishii at least for the reasons that Claim 9 is not anticipated by such reference. Accordingly, Applicants respectfully request withdrawal

of the rejections to independent Claim 9 and dependent Claims 10-12 under 35 U.S.C. § 102(e).

(4) Rejection of Independent Claim 18 and Dependent Claim 19

Independent Claim 18 also recites limitations relating to rinsing. Therefore, at least for the reason stated with respect to Claim 1, Claim 18 is not anticipated by Kishii. Because Claim 19 depends from Claim 18, Claim 19 contain all of the limitations of Claim 18, and is not anticipated by Kishii at least for the reasons that Claim 18 is not anticipated by such reference. Accordingly, Applicants respectfully request withdrawal of the rejections to independent Claim 18 and dependent Claim 19 under 35 U.S.C. § 102(e).

B. 35 U.S.C. § 103(a): Rejection of Claims 6, 8, 13-14, 16-17, 20-22.

Claims 6, 8, 13-14, 16-17, and 20-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kishii as applied to claims 1-5, 7, 9-12, 15, and 18-19. In order to render a claim obvious, the relied upon reference(s) must teach or suggest every limitation of the claim such that the invention as a whole would have been obvious to one skilled in the art at the time the invention was made.

Kishii does not teach or suggest rinsing a surface of a metal plug. Instead, Kishii only teaches an "acid cleaning process" (Kishii, col. 14, lines 56-57). The hydrogen peroxide recited in Kishii is used as part of an acidic cleaning solution used in a "cleaning process" (see, generally, col. 4, lines 3-34). Kishii does not teach or suggest rinsing, and, more specifically, does not suggest using hydrogen peroxide for rinsing a metal plug. Therefore, Kishii does not teach or suggest every limitation of independent Claims 1, 9 and 18 such that the invention as a whole would have been obvious at the time the invention was made to one skilled in the art. Therefore, independent Claims 1, 9, and 18 are not obvious based upon Kishii as applied to claims 1-5, 7, 9-12, 15, and 18-19. Accordingly, Kishii as applied to Claims 1-5, 7, 9-12, 15, and 18-19 is an improper basis for an obviousness rejection of Claims 6, 8, 13-14, 16-17, and 20-22.

Accordingly, withdrawal of the rejection of Claims 6, 8, 13-14, 16-17, and 20-22 under 35 U.S.C. § 103(a) is respectfully requested. Because Kishii as applied to claims 1-5, 7, 9-12, 15, and 18-19 is an improper basis for an obviousness rejection, Applicants respectfully submit that, without prejudice, Applicants are not at this time required to address the USPTO's conclusion that claims 6, 8, 13-14, 16-17, and 20-22 represent matters of routine optimization.

C. New Claims

Claims 23-28 are added. Each claim describes rinsing after polishing. In that sense, claims 23-28 are not anticipated by Kishii. Claims 23-25 describe rinsing with a solution consisting of hydrogen peroxide. Claims 26-28 describe rinsing with a solution consisting essentially of hydrogen peroxide.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending are now in condition for allowance and such action is earnestly solicited at the earliest possible date. If there are any fees due in connection with the filing of this response, please charge those fees to our Deposit Account No. 02-2666. If a telephone interview would expedite the prosecution of this Application, the USPTO is invited to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited as First Class Mail with the United States Postal Service in an envelope addressed to: Box Fee Amendment, Assistant Commissioner for Patents, Washington, D.C. 20231 on September 17, 2001.

Lillian E. Rodriguez

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Date